CLAIMS

We claim:

1. A substantially homogenous cell population which co-express CD49c, CD90 and telomerase.

2. The cell population of Claim 1, wherein expression of telomerase is a relative expression of greater than between about 1 transcript of telomerase per 10^6 transcripts of an 18s rRNA and about 10 transcripts of telomerase per 10^6 transcripts of an 18s rRNA.

3. The cell population of Claim 1, having a doubling time of less than about 144 hours.

4. The cell population of Claim 1, having a doubling time of less than about 72 hours.

5. The cell population of Claim 1, having a doubling time of less than about 48 hours.

6. The cell population of Claim 1, which has the potential to differentiate into a preselected phenotypes.

7. The cell population of Claim 1, which has the potential to differentiate into a preselected phenotype selected from the group consisting of a chondrocyte, an astrocyte, an oligodendrocyte, a neuron, osteocyte, osteoblast, osteoclast, a cardiomyocyte, a pancreatic islet cell, a skeletal muscle, a smooth muscle, a hepatocyte and a retinal ganglial cell.

8. The cell population of Claim 1, further including expression of P21 or P53 after between about 20 to about 50 population doublings of the cells, wherein expression of P53 is a relative expression of up to about 3000 transcripts of P53 per 10^6 transcripts of an 18s rRNA and expression of P21 is a relative expression of up to about 20,000 transcripts of P21 per 10^6 transcripts of an 18s rRNA.

9. The cell population of Claim 1, wherein the cells are derived from a source selected from the group consisting of a bone marrow, a skin, a fat, an umbilical cord blood, a muscle and a placental source.

10. The cell population of Claim 1, wherein the cells are derived from bone marrow.

11. The cell population of Claim 1, wherein the bone marrow cells are human bone marrow cells.

12. The cell population of Claim 1, wherein the cell population does not express CD34 and/or CD45.

13. The cell population of Claim 1, wherein the cells express at least one trophic factor selected from the group consisting of BDNF, IL-6, NGF and MCP-1.

14. A substantially homogenous cell population with co-express CD49c and CD90, but does not express bone sialoprotein.

15. The cell population of Claim 14, wherein the cells also express telomerase.

16. The cell population of Claim 14, wherein the cells have a doubling time of less than about 144 hours.

17. The cell population of Claim 14, wherein the cells have a doubling time of less than about 72 hours.

18. The cell population of Claim 14, wherein the cells have a doubling time of less than about 48 hours.

19. The cell population of Claim 14, wherein the cells have the potential to differentiate into a preselected phenotype.

20. The cell population of Claim 19, wherein the preselected phenotype is selected from the group consisting of a chondrocyte, an astrocyte, an oligodendrocyte, a neuron, an osteocyte, an osteoblast, an osteoclast, a cardiomyocyte, a pancreatic islet cell, a skeletal muscle, a smooth muscle, a hepatocyte and a retinal ganglial cell.

21. The cell population of Claim 14, further including expression of P21 or P53 after between about 20 to about 50 population doublings of the cells, wherein expression of P53 is a relative expression of up to about 3000 transcripts of P53 per 10^6 transcripts of an 18s rRNA and expression of P21 is a relative expression of up to about 20,000 transcripts of P21 per 10^6 transcripts of an 18s rRNA.

22. The cell population of Claim 14, wherein the cells are derived from a source selected from the group consisting of a bone marrow, a skin, a fat, an umbilical cord blood, a muscle and a placental source.

23. The cell population of Claim 14, wherein the cells are derived from bone marrow.

24. The cell population of Claim 23, wherein the bone marrow cells are human bone marrow cells.

25. The cell population of Claim 14, wherein the cell population does not express CD34 and/or CD45.

26. The cell population of Claim 14, wherein the cell population express at least one trophic factor selected from the group consisting of BDNF, IL-6, NGF and MCP-1.

27. A method of making a substantially homogenous cell population which co-express CD49c and CD90, comprising the steps of:

a) culturing a source of the cell population at a seeding density of less than about 100 cells/cm^2 under a low oxygen condition; and

b) selecting from the cultured source of the cell population, cells which co-express CD49c and CD90.

28. The method of Claim 27, wherein the source of the cell population is bone marrow.

29. The method of Claim 27, wherein the bone marrow is human bone marrow.

30. The method of Claim 27, wherein the low oxygen condition is less than about 15% oxygen.

31. The method of Claim 30, wherein the low oxygen condition is about is less than about 10% oxygen.

32. The method of Claim 27, wherein the low oxygen condition is about 5% oxygen.

33. The method of Claim 28, further including lysing the bone marrow prior to culturing the bone marrow.

34. The method of Claim 28, further including fractionating the bone marrow prior to culturing the bone marrow.

35. The method of Claim 34, wherein in the bone marrow is fractionated by passage through a density gradient.

36. The method of Claim 34, wherein the bone marrow is fractionated by NH_2Cl lysis.

37. The method of Claim 34, wherein the bone marrow is fractionated by fluorescent activated sorting.

38. The method of Claim 34, wherein the bone marrow is fractionated by magnetic sorting.

39. The method of Claim 27, wherein the cells which co-express CD49c and CD90 do not express CD34 and/or CD45.

40. The method of Claim 27, wherein the cells selected from the cultured source express at least one trophic factor selected from the group consisting of BDNF, IL-6, NGF and MCP-1.

41. A method of making a substantially homogenous cell population which co-express CD49c and CD90, comprising the steps of:

a) culturing a source of the cell population at a seeding density of less than about 100 cells/cm^2 under a low oxidative stress condition; and

b) selecting from the cultured source of the cell population, cells which co-express CD49c and CD90.

42. The method of Claim 41, wherein the source of the cell population is bone marrow.

43. The method of Claim 41, wherein the bone marrow is human bone marrow.

44. A method of making a substantially homogenous cell population which co-express CD49c and CD90, comprising the steps of:

a) culturing a source of the cell population at a seeding density of less than about 50 cells/cm^2 under a low oxidative stress condition; and

b) selecting from the cultured source of the cell population, cells which co-express CD49c and CD90.

45. A method of making a substantially homogenous cell population which co-express CD49c and CD90, comprising the steps of:

a) culturing a source of the cell population at a seeding density of less than about 30 cells/cm^2 under a low oxidative stress condition; and

b) selecting from the cultured source of the cell population, cells which co-express CD49c and CD90.

46. A method of making a substantially homogenous cell population which co-express CD49c and CD90, comprising the steps of:

a) culturing a source of the cell population at a seeding density of less than about 75,000 cells/cm^2 under a low oxidative stress condition to produce an adherent cell population;

b) culturing the adherent cell population at a seeding density of less than about 100 cells/cm^2 under a low oxidative stress condition; and

c) selecting from the cultured adherent cell population, cells which co-express CD49c and CD90.

47. A method of making a substantially homogenous cell population which co-express CD49c and CD90, comprising the steps of:

a) culturing a source of the cell population at a seeding density of less than about 50 cells/cm^2 under a low oxygen condition; and

b) selecting from the cultured source of the cell population, cells which co-express CD49c and CD90.

48. A method of making a substantially homogenous cell population which co-express CD49c and CD90, comprising the steps of:

a) culturing a source of the cell population at a seeding density of less than about 30 cells/cm^2 under a low oxygen condition; and

b) selecting from the cultured source of the cell population, cells which co-express CD49c and CD90.

49. A method of making a substantially homogenous cell population which co-express CD49c and CD90, comprising the steps of:

a) culturing a source of the cell population at a seeding density of less than about 75,000 cells/cm^2 under a low oxygen condition to produce an adherent cell population;

b) culturing the adherent cell population at a seeding density of less than about 100 cells/cm^2 under a low oxygen condition; and

c) selecting from the cultured adherent cell population, cells which co-express CD49c and CD90.

50. The method of Claim 49, wherein the source of the cell population is bone marrow.

51. The method of Claim 50, wherein the bone marrow is human bone marrow.

52. The method of Claim 49, wherein the low oxygen condition is about 5% oxygen.

53. The method of Claim 49, further including lysing the bone marrow prior to culturing the bone marrow.

54. The method of Claim 49, further including fractionating the bone marrow prior to culturing the bone marrow.

55. The method of Claim 54, wherein in the bone marrow is fractionated by passage through a density gradient.

56. The method of Claim 54, wherein the bone marrow is fractionated by NH_2Cl lysis.

57. The method of Claim 54, wherein the bone marrow is fractionated by fluorescent activated sorting.

58. The method of Claim 54, wherein the bone marrow is fractionated by magnetic sorting.

59. The method of Claim 49, wherein the cells which co-express CD49c and CD90 do not express CD34 and/or CD45.

60. The method of Claim 49, wherein the cells selected from the cultured source express at least one trophic factor selected from the group consisting of BDNF, IL-6 and MCP-1.

61. A method of treating a human suffering from a degenerative or acute injury condition, comprising the step of administering to the human a substantially homogenous cell population which co-express CD49c and CD90.

62. A method of treating a human suffering from a neurological condition, comprising the step of administering to the human a substantially homogenous cell population which co-express CD49c and CD90.

63. The method of Claim 62, wherein the cell population does not express CD34 and/or CD45.

64. A method treating a human suffering from a cardiac condition, comprising the step of administering to the human a substantially homogenous cell population which co-express CD49c and CD90.

65. A method of treating a human suffering from a neurological condition, comprising the steps of :

a) culturing a source of a cell population at a seeding density of less than about 100 cells/cm^2 under a low oxygen condition;

b) selecting from the cultured source of the cell population, a population of cells which co-express CD49c and CD90; and

c) administering the population of cells which co-express CD49c and CD90 to the human.

66. The method of Claim 65, wherein the cells which co-express CD49c and CD90 are administered to a human suffering from a neurological condition selected from the group consisting of a spinal cord injury, an amyotrophic lateral sclerosis, a Parkinson's Disease, a stroke, a traumatic brain injury, a Fabry Disease condition, metachromatic distropy, adrenal leukodystrophy, Canavan disease, Pelizaeus Merzbacher, Nieman-pick and a brain tumor.

67. The method of Claim 65, wherein the source of the cell population is bone marrow.

68. The method of Claim 67, wherein the bone marrow is human bone marrow.

69. The method of Claim 65, wherein the low oxygen condition is less than about 15% oxygen.

70. The method of Claim 69, wherein the low oxygen condition is less than about 10% oxygen.

71. The method of Claim 66, wherein the low oxygen condition is about 5% oxygen.

72. The method of Claim 65, wherein the cells selected from the cultured source express at least one trophic factor selected from the group consisting of BDNF, IL-6 and MCP-1.

73. A method of making a committed progenitor cell, comprising the steps of:
    a) culturing a source of a cell population;
    b) selecting from the cultured source of the cell population, cells which co-express CD49c and CD90; and
    c) modifying the cells which co-express CD49c and CD90 to become committed progenitor cells.

74. The method of Claim 73, wherein the cells which co-express CD49c and CD90 are selected from the cultured source of the cell population by a low oxygen condition.

75. The method of Claim 74, wherein the low oxygen condition is about 5% oxygen.

76. The method of Claim 73, wherein the source of the cell population is bone marrow.

77. The method of Claim 76, wherein bone marrow is human bone marrow.

78. A method of treating a human suffering from a degenerative or acute injury condition, comprising the step of administering to the human a substantially homogenous cell population which co-express CD49c, CD90 and telomerase.

79. A method of treating a human suffering from a neurological condition, comprising the steps of:

a) culturing a source of a cell population;

b) selecting from the cultured source of the cell population, cells which co-express CD49c and CD90;

c) modifying the cells which co-express CD49c and CD90 to become a committed progenitor cell; and

d) administering the committed progenitor cell to the human.

80. The method of Claim 79, wherein the cells which co-express CD49c and CD90 are administered to a human with a neurological condition selected from the group consisting of a spinal cord injury, an amyotrophic lateral sclerosis, a Parkinson's Disease, a stroke, a traumatic brain injury, a Fabry Disease condition, metachromatic distropy, adrenal leukodystrophy, Canavan disease, Pelizaeus Merzbacher, Nieman-pick and a brain tumor.

81. The method of Claim 79, wherein the source of the cell population is bone marrow.

82. The method of Claim 81, wherein the bone marrow is human bone marrow.

83. The method of Claim 79, wherein the source of the cell population is cultured under a low oxygen condition.

84. The method of Claim 79, wherein the bone marrow is fractionated by fluorescent activated sorting.

85. The method of Claim 79, wherein the bone marrow is fractionated by magnetic sorting.

86. The method of Claim 83, wherein the low oxygen condition is about 5% oxygen.

87. The method of Claim 79, wherein the cells selected from the cultured source express at least one trophic factor selected from the group consisting of BDNF, IL-6 and MCP-1.

88. A pharmaceutical composition comprising a substantially homogeneous cell population which co-express CD49c and CD90.

89. The pharmaceutical composition of Claim 88, wherein the substantially homogeneous cell population which co-express CD49c and CD90 has at least about 10^5 cells.

90. The pharmaceutical composition of Claim 88, wherein the substantially homogeneous cell population which co-express CD49c and CD90 has at least about 10^6 cells.

91. The pharmaceutical composition of Claim 88, wherein the cell population does not express CD34 and/or CD45.

92. The pharmaceutical composition of Claim 88, wherein the cell population express at least one trophic factor selected from the group consisting of BDNF, IL-6, NGF and MCP-1.

93. A pharmaceutical composition comprising a substantially homogeneous cell population which co-express CD49c, CD90 and telomerase.

94. A method of treating a human suffering from a neurological condition, comprising the step of administering to the human a substantially homogenous cell population which co-express CD49c, CD90 and telomerase.

95. A method of treating a human suffering from a degenerative or acute injury condition, comprising the step of administering to the human a substantially homogenous cell population which co-express CD49c, CD90 and a bone lineage marker.

96. A method of treating a human suffering from a neurological condition, comprising the step of administering to the human a substantially homogenous cell population which co-express CD49c, CD90 and a bone lineage marker.